

State: HIMACHAL PRADESH
Agriculture Contingency Plan for District: Lahaul & Spiti

1.0 District Agriculture profile			
1.1	Agro-Climatic/Ecological Zone	Western Himalayas, Warm Subhumid (To Humid With Inclusion Of Perhumid) Eco-Region. (14.1)	
	Agro-Climatic Region (Planning Commission)	Western Himalayan Region (I)	
	Agro Climatic Zone (NARP)	High hills temperate dry zone(HP-4)	
	List all the districts falling under the NARP Zone* (*>50% area falling in the zone)	Northern parts of Chamba, Kullu, major Southern part of Lahaul & Spiti (Keylong), Kalpa (Kinnaur)& North-North Eastern parts of Lahaul & spiti valley	
	Geographic coordinates of district	Latitude	Longitude
		31°44' 57'' to 33°42' 54'' N	76° 46' 29'' to 78° 41' 34'' E
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Highland Agricultural Research and Extension Centre, Kukumseri, Ph. 01909 222210 (O)	
		Scientist Incharge, CSKHPKV research Sub-station, Lari, L&S Scientist Incharge, UHF Research substation, Tabo, Block Spiti, L&S	
	Mention the KVK located in the district with address	Krishi Vigyan Kendra, Lahaul &Spiti at Kukumseri. Himachal Pradesh-175141 Phone 01909-222666 (O)	
	Name and address of the nearest Agromet Field Unit (AMFU, IMD) for agro-advisories in the Zone	Highland Agricultural Research and Extension Centre, Kukumseri, Ph. 01909 222210 (O)	

1.2	Rainfall	Average(mm)	Normal onset	Normal cessation
	SW monsoon (June – Sep)	187	1 st week of July	2 nd week of September
	NE Monsoon (Oct – Dec)	37	1 st week of October	4 th week of December
	Winter (Jan – Feb)	97		
	Summer (March– May)	143		
	Annual	464		

1.3 Land use pattern of the district

1.3	Land use pattern of the district (latest statistics)	Geographical area (Village papers)	Net sown area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	911.3	3.3	135.4	135.7	220.1	0.6	0.1	415.8	0.1	-

Source: Statistical outline of Himachal Pradesh, 2008-09

1.4 Major soils

1.4	Major Soils	Area ('000 ha)	Percent (%) of total	Physiography	Elevation
	1. Medium deep, sandy-skeletal soils	6	1.2	Mountains and valle glaciers	Greater Himalayas
	2. Medium deep, sandy-skeletal soils	277	58.9	Side/ Reposed slopes	Greater Himalayas
	3. Deep loamy calcareous soils	23	4.9	Side/ Reposed slopes	Greater Himalayas
	4. Medium deep, sandy-skeletal soils	21	4.5	Glacio-fluvial valley	Greater Himalayas
	5. Deep, sandy-skeletal soils	2	0.4	Glacio-fluvial valley	Greater Himalayas
	6. Shallow to medium shallow loamy soils	4	0.8	Summits and Ridge tops	Lesser Himalayas
	7. Shallow loamy skeletal soils	41	8.7	Side/ Reposed slopes	Lesser Himalayas
	8. Medium deep, loamy calcareous soils	57	12.2	Side/ Reposed slopes	Lesser Himalayas
	9. Shallow to medium deep loamy soils	17	3.6	Side/ Reposed slopes	Lesser Himalayas

10. Medium deep to deep loamy soils	22	4.7	Side/ Reposed slopes	Lesser Himalayas
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1.5	Agricultural land use (ha)	Area ('000 ha)	Cropping intensity %
	Net sown area	3.3	106%
	Area sown more than once	0.2	
	Gross cropped area	3.5	

*Source: Land Utilization Pattern in Lahaul & Spiti, 2010-11, Deputy Commissioner, Lahaul & Spiti at Keylong

1.6	Irrigation	Area ('000 ha)		
	Net irrigated area	3.3		
	Gross irrigated area	3.5		
	Rainfed area			
	Sources of Irrigation	Number	Area ('000 ha)	Percentage
	Canals			
	Tanks			
	Tube wells			
	Bore wells			
	Other wells			
	Lift irrigation schemes	3	0.07	
	Kuhls	127	3.4	Melting snow water is conveyed through Kuhls and applied mainly through flooding and rarely through sprinklers
	Other sources		0.014	
	Total Irrigated Area		3.5	100
	Micro-irrigation	Melting snow water is conveyed through Kuhls and applied mainly through sprinklers		
	Pump sets	22		
	No. of Tractors	106	2.45	
Groundwater availability and use* (Data	No. of blocks	(%) area	Quality of water	

	source: State/Central Ground water Department /Board)			
	Over exploited			
	Critical			
	Semi- critical			
	Safe		100	Good
	Wastewater availability and use			
	Ground water quality	Good, EC<750m mhos/cm at 25 ⁰ C		
*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

*Source: District Agriculture and Revenue Deptt, Strategic Research Plan of Lahaul & Spiti prepared by Agricultural technology Management Agency (ATMA) & Land Utilization pattern in Lahaul & Spiti 2010-11, Deputy Commissioner, Lahaul & Spiti at Keylong

1.7 . Major field crops & horticulture

S.No.	Major crop cultivated	Total area (ha)	Irrigated (ha)	Rainfed
	Peas	1770	1770	
	Potato	748	748	
	Cauliflower	38	38	
	Carrot	6	5	
	Cabbage	5	6	
	Barley	429	429	
	Buckwheat	92	92	
	Wheat	46	46	
	Rajmash	38	38	
	Sarson	29	29	
Fruits				
	Apple	190	190	
	Apricot	12	12	
	Walnut	3	3	

Medicinal				
	Kuth	45	45	
	Mannu	22	22	
	Hops	20	20	

*Source: Land Utilization pattern in Lahaul & Spiti 2010-11, Deputy Commissioner, Lahaul & Spiti at Keylong.

1.8	Livestock		
	Type of animals	Total Number (*000)	
	Crossbred cows	5.9	
	Local cows	6.3	
	Goats	20.5	
	Sheep	41.5	
	Bullocks	2.0	
	Equines	3.9	
	Yak	2.8	
	Total Livestock	83.1	
	Poultry	2.9	

*Source: District Agriculture Plan L&S Himachal Pradesh Volume-III Department of Agriculture (H.P.) consulting agency CSK Himachal Pradesh Agricultural University Palampur-176 062 (Field Survey, 2007-08)

1.10	Fisheries (Data source: Chief Planning Officer)					
	A. Capture					
i) Marine (Data Source: Fisheries Department)	No. of fishermen	Boats		Nets		Storage facilities (Ice plants etc.)
		Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)	
ii) Inland (Data Source: Fisheries Department)	No. Farmer owned ponds		No. of Reservoirs		No. of village tanks	

	B. Culture			
		Water Spread Area (ha)	Yield (t/ha)	Production ('000 tons)
	i) Brackish water (Data Source: MPEDA/ Fisheries Department)	12		
	ii) Fresh water (Data Source: Fisheries Department)			

1.11 Production and Productivity of major crops

Name of crop	Production (MT)	Productivity (q/ha)
Barley	753	12
Buckwheat	205	22
Wheat	264	14
Rajmash	360	10
Cauliflower	1140	300
Potato	21362	245
Cabbage	120	240
Pea	9307	70.0

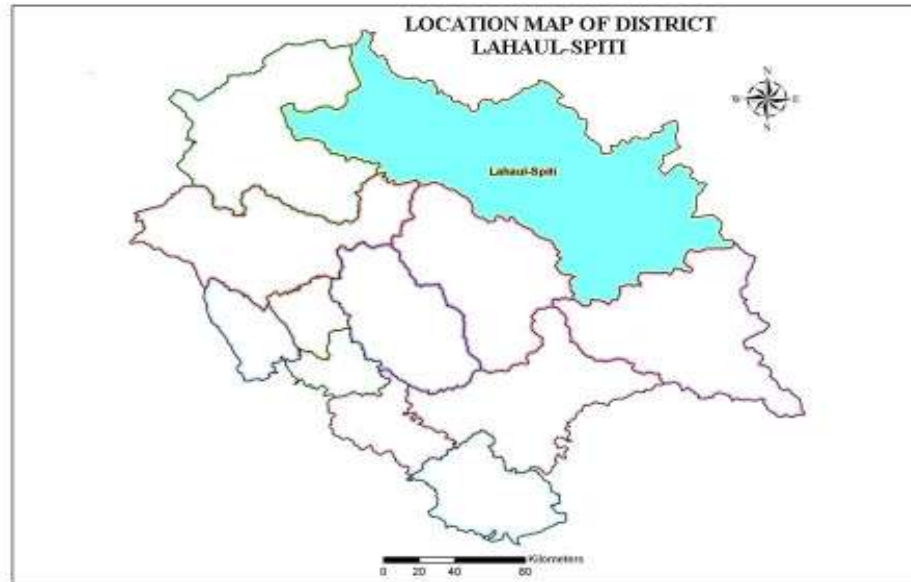
1.12	Sowing window for 5 major field crops	Green peas	Potato	Barley	Buckwheat	Wheat
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	Kharif/rabi crops (all irrigated;cropping period is from March end to first fortnight of October). Snow covers the entire area from November to March and hence sowing impossible	March to June	1 st fortnight of April to 2 nd fortnight of April	2 nd fortnight of April to 4 th week of May	2 nd week July to 4 th week of July	3 rd week April to mid May (after snow melting)
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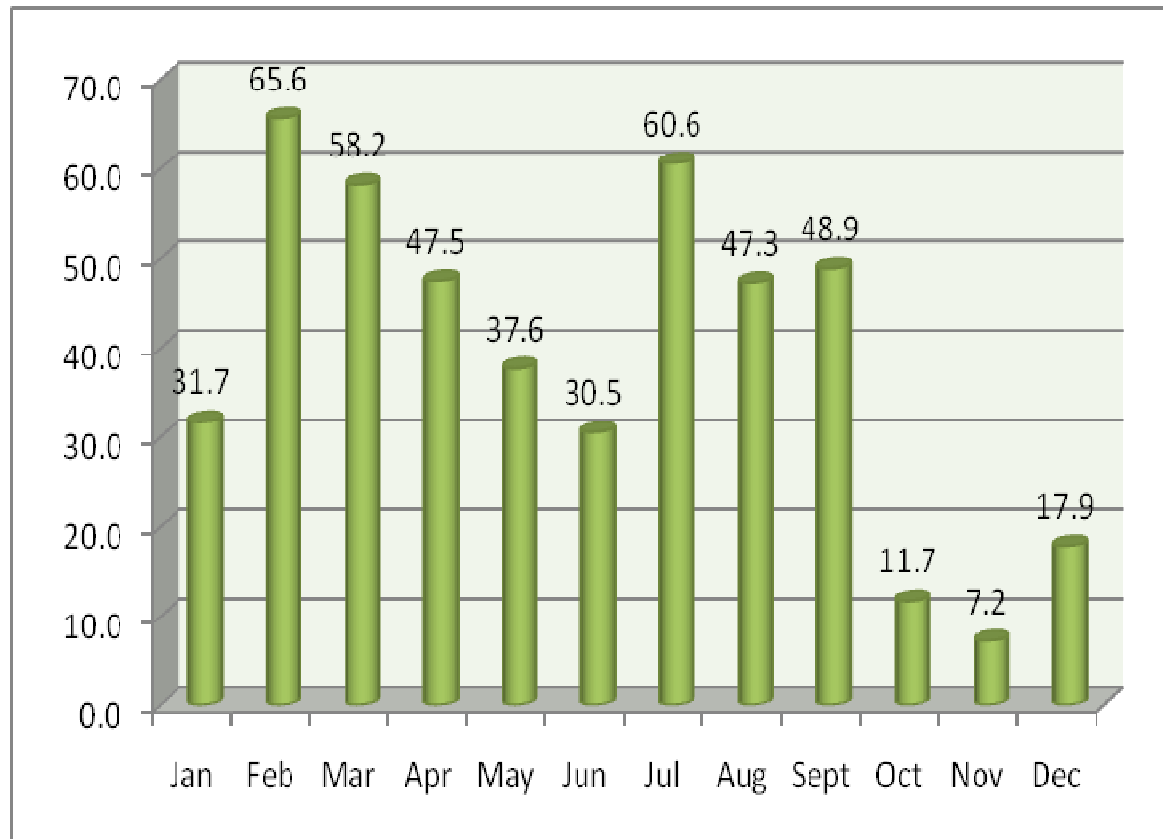
1.13	What is the major contingency the district is prone to? (Tick mark)	Regular	Occasional	None
	<i>Cropping season (April to October)</i>			
	Drought		√	
	Flood			√
	Cyclone			√
	Hail storm			√
	Heat wave			√
	Cold wave	√		
	Frost			√
	Sea water intrusion			√
	Pests and disease outbreak (Borers, Fungal, Bacterial and Viral diseases)		√	
	Landslides	√		

1.14	Include Digital maps of the district for	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: Yes

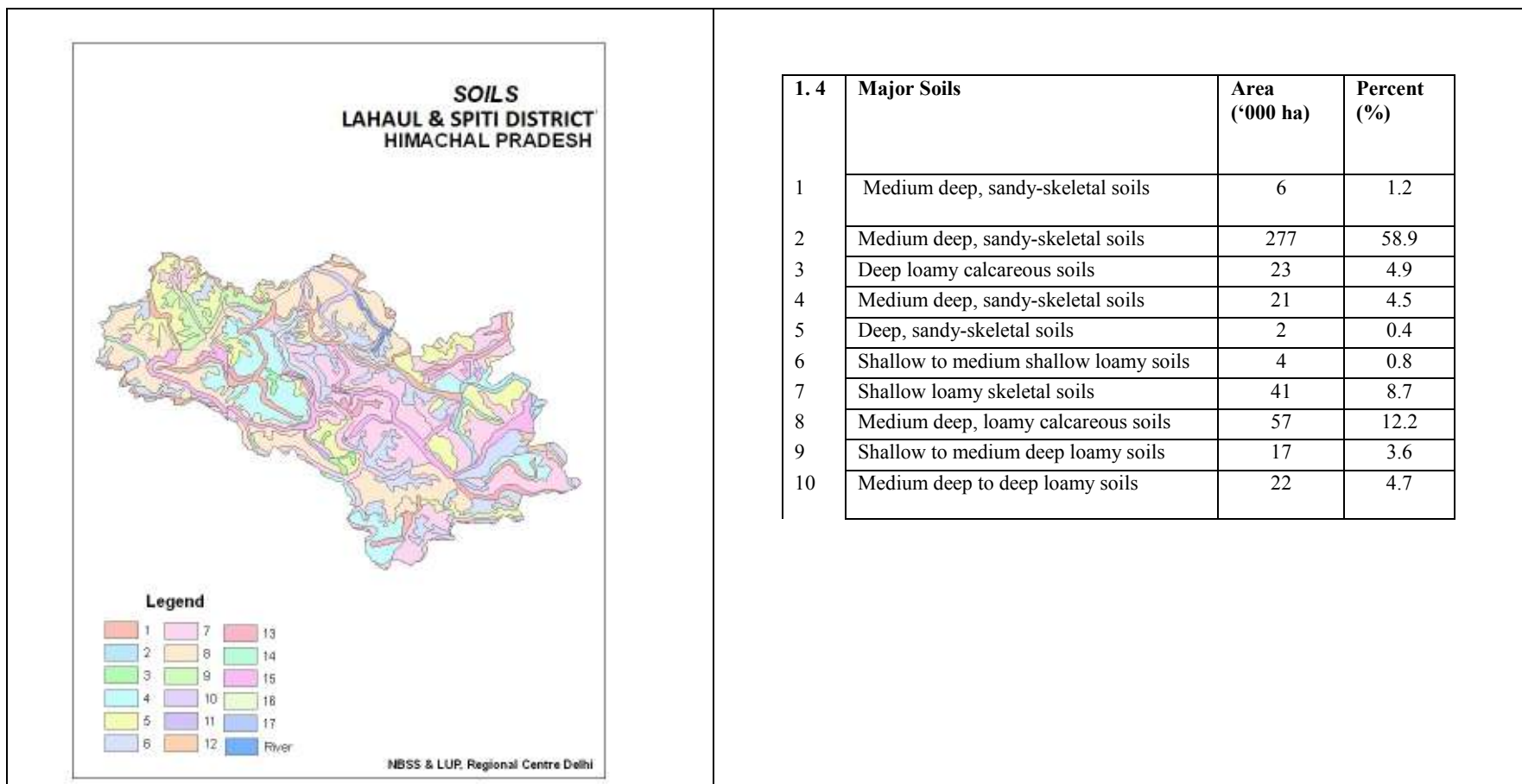
Annexure I Location map



Annexure II



Annexure III -Soil map



2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rain fed situation: Not applicable as the crop cultivation is possible from melting snow water

Condition	Suggested Contingency measures				
	Major Farming situation ^a	Crop/cropping system ^b	Change in crop/cropping system ^c	Agronomic measures ^d	Remarks on Implementation ^e
Early season drought (delayed onset)	Not Applicable				
Delay by 2,4,6 and 8 weeks	Not Applicable				
Early season drought (Normal onset)	Not Applicable				
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	Not Applicable				
At flowering/ fruiting stage	Not Applicable				

2.1.2 Drought - Irrigated situation

Condition	Suggested contingency measures				
	Major Farming situation	Normal Crop	Change in crop/cropping system	Agronomic measures	Remarks on Implementation
Delayed release of water in <i>kuhls</i> due to low rainfall					

Limited release of water in <i>kuhls</i> due to any reason	Shallow to medium deep, sandy loamy soils	Peas	Barley (Dolma, HBL 249)	Life saving irrigation, Chemical weed control, Frequent interculture to create soil mulch , Foliar spray of nutrients, Mulching, Hoeing after irrigation	Seed supply through Department of Agriculture
		Potato , Cauliflower	Barley (Dolma, HBL 249)		
		Cabbage (Golden Acre, Pride of India, Large late Drum Head)	Cabbage	Life saving sprinkler irrigation, Frequent interculture to create dust mulch , Foliar spray of nutrients, Hoeing after irrigation Mulching, Manuring with 20t FYM/ha and 125:50:30 kg N, P ₂ O ₅ and K ₂ O/ ha.	
		French bean	French bean (Contender, Premier, Kentucky Wonder)		
		Summer squash , Onion , Lettuce ,	Summer squash (Selection 1,9), Onion (Local,N 53, Agri Found Dark Red), Lettuce (leafy/Iceberg, Leek,		

		Tomato(7711/ 129601)		
Field crops				
Barley	Barley (Dolma, BHS 249)	Life saving sprinkler irrigation, Frequent interculture to create soil mulch , Foliar spray of nutrients, manuring with 40:25:15 kg/ha N, P ₂ O ₅ and K ₂ O.	Seed supply through Department of Agriculture	
Wheat	Wheat(Saptdhara, Himpratham, HPW 42)	Life saving sprinkler irrigation, Frequent interculture to create soil mulch with 90:50:30 kg N, P ₂ O ₅ and K ₂ O/ha. Weed control using 2,4-D at 45 days after sowing (750- 800 litre water/ha.)		
Buckwheat	Buckwheat (Uday, USDA 1)	Life saving sprinkler irrigation, frequent interculture to create soil mulch, manuring with 40:40 kg N, P ₂ O ₅ /ha. Weed control using 1.5kg Alachlor in 800 lt of water/ha within two days of sowing.		

Pulse			
Rajmash	Rajmash (Him 1, Kanchan, Triloki)	Life saving sprinkler irrigation, frequent interculture to create soil mulch, Manuring, Hoeing after irrigation. Weed control using Pendimethalin 1.2 kg or Alachlor 1.5 kg or Metachlor 1.5kg/ha within 48hrs of sowing in 750-800lt water/ha.	
Oilseed			
Mustard/toria	Mustard/toria (Bhawani & Yunger- a local race)	Life saving sprinkler and frequent interculture to create soil mulch and Manuring	
Medicinal Plants			
Hops	Hops (Late cluster, Harmukh, Hybrid 2)	Mulching & Drip irrigation, Manuring using 25-30 t/ha FYM, 100:40:120 kg N, P ₂ O ₅ and K ₂ O/ha. hoeing	

				after irrigation	
		Kuth	Kuth(Local races)	Mulching & sprinkler irrigation, Manuring using 25:25:25 kg N, P ₂ O ₅ and K ₂ O/ha.	
		Mannu	Mannu (local races)	Mulching & flooding irrigation, Manuring	
		Kala Zeera	Kala Zeera (local races)	Usually growing in uncultivated lands	
Horticultural					
		Apple	Apple (Top Red, Royal Delicious, Delicious, Golden Delicious, Red Chief, Oregon Spur, Red Gold (P), Gold Spur, Munchurian crob (P); For high altitudes- Top Red, Hardeman, Skyline Suprens)	Drip irrigation & Mulching, hoeing after irrigation, organic manuring	Quality planting material to be provided by Department of Horticulture
		Apricot	Apricot (Shakarpara, Charmguz,	Drip irrigation & Mulching, manuring.	

			Halman)		
		Cherry	Cherry (Stella (var & polliniser, Red Heart, Black Heart)	Drip irrigation & Mulching, manuring.	
		Seabuckthorn	Seabuckthorn	Drip irrigation & Mulching, manuring.	
		Plum	Plum (Prune) – Stanley variety	Drip irrigation & Mulching, manuring.	
Non release of water in kuhls under delayed onset of monsoon in catchment	Not applicable				
Lack of inflows into tanks due to insufficient / delayed onset of monsoon	Not applicable				
Insufficient groundwater recharge due to low rainfall	Not applicable				

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition	Suggested contingency measures			
	Vegetative stage	Flowering stage	Crop maturity stage	Post harvest
Continuous high rainfall in a short span leading to water logging				
Peas	Water drains out automatically as the soil has poor water retentivity, however, if it stagnates at depressions, that be drained out	Drainage if water stagnates at certain depressions. Proper bunding of fields to check spread of root rot complex. Drainage to common channel.	Drainage of fields; harvesting be delayed till a clear weather is clear	Sun dry and immediate packing and transport
Potato	Additional N may be applied if rains come after the topdressing of N, hoeing & weeding	Drainage if water stagnates at certain depressions. Fungicide spray to check late blight.	Provide drainage	Take the produce to a safe storage place and allow to dry before packaging
Barley	Additional dose of nitrogen (25kg/ha) to avoid deficiency of nitrogen (yellowing) caused due to leaching,	Water drains out automatically as the soil has poor water retention	Water drains out automatically as the soil has poor water retention	Sun drying
Wheat	Additional dose of nitrogen (25kg/ha) to remove deficiency of nitrogen (yellowing) caused due to leaching, hoeing & weeding	Water drains out automatically as the soil has poor water retention	Water drains out automatically as the soil has poor water retention	Sun drying
Buckwheat	Application of nitrogen in spots where yellowing has taken place; hoeing & weeding	Water drains out automatically as the soil has poor water retention	Immediate harvesting if physiological maturity has taken place	Take the produce to covered place and ensure moisture at 8-9% at storage through drying
Cauliflower/cabbage	Drainage of fields and use of split nitrogen when the sky is clear , hoeing & weeding	Provide drainage, use of NPK	Drainage	Immediately market the heads which are ready

Apple		Use flower bouquet (for pollination) for ensuring the fruit set	Use of Planofix (10 ppm) to avoid fruit shedding and use of fungicides (100 g Carbendazim /200 L of water) to avoid scab	Sun drying
Heavy rainfall with high speed winds in a short span				
Barley Wheat Buckwheat			Allow the crop to dry and then harvest the produce	Sun drying
Apple	Use Bordeaux mixture on damaged branches	Use flower bouquet for ensuring the fruit set and use of Chlorpyrifos (2 ml/L of water) immediately after rains to avoid the attack of insects	Use of Planofix (10 ppm) to avoid fruit shedding and use of fungicides to avoid scab and insecticides to avoid caterpillar attack	Use calcium chloride for better keeping quality
Outbreak of pests and diseases due to unseasonal rains				
Barley Wheat Buckwheat		Spray Mancozeb(0.2%) if yellow rust in wheat and barley appears		Sun drying
Peas	Always sow treated seed with Carbendazim	Spray 0.5 g Dinocap/L water if powdery mildew appears	Spray 0.5 g Hexa conazole/L water if powdery mildew appears	Market after grading
Potato	Spray Zineb (0.2%) if early blight appears	Control Late blight with 2 sprays at fortnightly interval of Metalaxyl (0.25%)	Remove foliage	Market after grading

		followed by two sprays of Mancozeb (0.2%) at weekly interval		
Horticulture /vegetable				
Cauliflower Cabbage	Spray of Karate (1 ml/L) if yellow eggs on leaves are seen		Remove the rotten heads, remove diseased leaves	
Apple	Spray TSO (tree spray oil 4 L/200 L)/ horticulture mineral oil (2.5 L/200L)to check the incidence of scale insects	Spray chlorpyriphos (2 ml/L) to control thrips in apple. After fruit setting spray Carbaryl (1.5 g/L) to control fruit scrapper	Use calcium chloride (5 g/L) before harvest	Spray 1% Urea + 0.3% Copper oxy chloride on the tree to maintain proper nutrition and to control further spread of canker due to injury to the spurs during harvesting of fruits

2.3 Floods : Not applicable

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measure ^r			
	Seedling / nursery stage	Vegetative stage	Reproductive stage	At harvest
Heat Wave ^p	Not applicable			
Cold wave ^q	Not applicable			
Frost	Not applicable			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1. Livestock (

Condition	Suggested contingency measures		
	Before the event	During the event	After the event
Drought	Insurance of livestock	Not applicable	

Feed and fodder availability	Improve horti-silvipastoral systems by growing Lucerne, Red clover, White clover, Orchard grass, Fescue grass, Salix, Poplar and Robinia. Promote Hay and Silage, complete feed block making for using in winters Store sufficient quantities of mineral mixture and Uromin Mineral Bricks (UMB)	Efforts should be made to store more of feed and fodder in advance of harsh winters	Prepare unproductive stock with healthy animals. Provide green fodder in recommended rates to the livestock.
Drinking water	Storage of adequate drinking water, Provision of water from groundwater sources.	Careful monitoring of drinking water of animals.	
Health and disease management	Vaccination and deworming. Surveillance of diseases. Preventive measures for diseases. Medicines and vaccines procurement	Keep animals in shade as far as possible, more protein diet in form of concentrates, Protection of animals from heat stress. Isolation of sick animals, Specific treatment.	Use of multi minerals and multi vitamins.
Floods	Not applicable		
Cyclone	Not applicable		
Cold wave			
Shelter/environment management	Make comfortable sheds with lesser windows and ventilators. House animals together, cover open windows with gunny bags, cover animals with gunny bags in the form of jackets.	Cover the young ones with gunny bags and give rich diets to the lactating and sick animals	Provision for good shelters /sheds be made available with some financial support from Government
Health and disease management	The medicines and feeds be stored in time. Prior arrangements for warm shelter.	Mobile van facility at doorstep during winters Provision of warm sheds/ shelter.	Vaccination & deworming Use of multi minerals and multi vitamins.

^s based on forewarning wherever available

2.5.2 Poultry :

	Suggested contingency measures	Convergence/linkages with ongoing programs
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				if any
	Before the event	During the event	After the event	
Drought	Not applicable			
Floods	Not applicable			
Cyclone	Not applicable			
Cold wave				
Shelter/environment management	Make comfortable structures	Feeding with rich diets and making the sheds air proof		
Health and disease management	Storage of feeds and medicines in time, awareness about the problem associated with cold wave for poultry production	Service of veterinarians for problems and providing rich feeds and medicines for ailment Provision of warm shelters/ sheds.	Selection of birds suitable for cold areas and provision of feeds and medicines in areas as per requirement and camps on awareness for problem in cold conditions and production issues	

^a based on forewarning wherever available

2.5.3 Fisheries :

Condition	Suggested contingency measures		
	Before the event	During the event	After the event
1) Drought	Not applicable		
2) Floods			
3. Cyclone / Tsunami			
4. Heat wave and cold wave			

^a based on forewarning wherever available